PetNAD™

FIV Detection Kit

For Feline Immunodeficiency Virus (Type A, B, C, E and F)

User Manual

For Research Use Only

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INTENDED USE

PetNAD™ FIV Detection Kit is intended for *in vitro* detection of FIV RNA based on insulated isothermal polymerase chain reaction (iiPCR) technology. This kit is designed specially to be used with an iiPCR-compatible instrument, **POCKIT™** Nucleic Acid Analyzer. The assay is intended for use by veterinarians or technicians with basic laboratory skills.

This kit is intended for research use only.

SUMMARY AND EXPLANATION

Feline immunodeficiency virus (FIV) is a lentivirus associated with AIDS-like illness in cats (Sodora et al., 1994). Five subtypes (A to E) have been isolated based on sequence diversity in various regions (Madhu et al., 2010). The primary routes of FIV transmission are through deep bite wounds and scratches, where the infected cat's saliva enters the other cat's bloodstream (American Association of Feline Practitioners, 2002). FIV could also be transmitted from pregnant females to the fetus in their utero. FIV infections are not necessarily fatal. Cats could live relatively healthy life and act as FIV

carriers for years. In initial phase or acute phase of FIV infection is often accompanied by mild symptoms such as fever, lethargy, anorexia, pyrexia and lymphadenopathy (Janet et al., 2010).

PCR is one of the most commonly accepted methods that provide high sensitivity and specificity for FIV detection. However, conventional PCR assays take three to four hours, and require sophisticated thermocyclers and well-trained technicians to perform. GeneReach has developed **PetNAD™** FIV Detection Kit based on iiPCR technology, which significantly reduces reaction time and offers sensitivity and specificity comparables to those of conventional nested PCR (Tsai, 2012; Chang, 2012). Furthermore, this simple and easy assay could be completed rapidly in a portable **POCKIT™** Nucleic Acid Analyzer.

PRINCIPLES OF THE PROCEDURE

In iiPCR, hydrolysis probe-based chemistry is used to generate fluorescent signal during amplification of target RNA. The primers and probe target *gag* gene and do not cross-react with nucleic acid from host and other feline pathogens.

PRODUCT DESCRIPTION

A. Materials Provided (24 tests/kit)

Component	Contents or Purpose	Amount
Premix Pack	■ FIV Premix (lyophilized pellet) containing dNTPs, primers, probe, and enzyme for amplification. ■ Desiccating agent pack.	24 bags (1 FIV Premix vial and desiccating agent/bag)
Premix Buffer A	■ Reaction buffer to re-dissolve the lyophilized pellet.	2 vials (1.3 ml/vial)
P(+) Standard	■ Dried plasmid containing FIV partial sequence.	1 vial
Standard Buffer	■ Reaction buffer to re-dissolve P(+) Standard.	1 vial (110 µl/vial)
R-tube		1 bag (24 pieces/bag)
Cap		1 bag (24 pieces/bag)
User Manual		1 copy

B. Materials and Equipments Required, but Not Provided

1) **PetNAD™** Nucleic Acid Co-prep Kit
2) **POCKIT™** Nucleic Acid Analyzer: **PetNAD™**-compatible instrument.
3) **cubee™** Mini-Centrifuge (cubee)
4) Micropipette and tips

C. Storage and Stability

1) The kit should be stored at 4℃ and is stable until the expiration date which is stated on the label.
2) Store Premix vials in sealed Premix Pack to avoid hydration of lyophilized components.
3) Reconstituted P (+) Standard is stable for 6 months at 4℃. Aliquot reconstituted P (+) Standard to avoid degradation of nucleic acid.

D. Sample Type

Nucleic acid extracted from whole blood.

PRECAUTIONS

A. Do not open R-tube(s) after reaction to prevent any carryover contamination.

B. Perform extraction and amplification in two independent spaces to minimize contamination.

C. Do not reuse R-tube and Premix.

D. Include the P(+) Standard to:

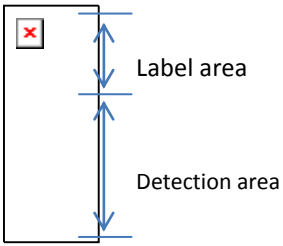
   1) Ensure **POCKIT™** Nucleic Acid Analyzer is working normally.

   2) Ensure detection kit performance after storage.

E. To get optimal fluorescence detection.

   1) Wear powder-free gloves to handle R-tubes.

   2) Do not label in the detection area of R-tube.



LIMITATIONS

A. The test should be used only for testing nucleic acid extracted from animal specimen. Do not add specimen (i.e. whole blood) directly into Premix.

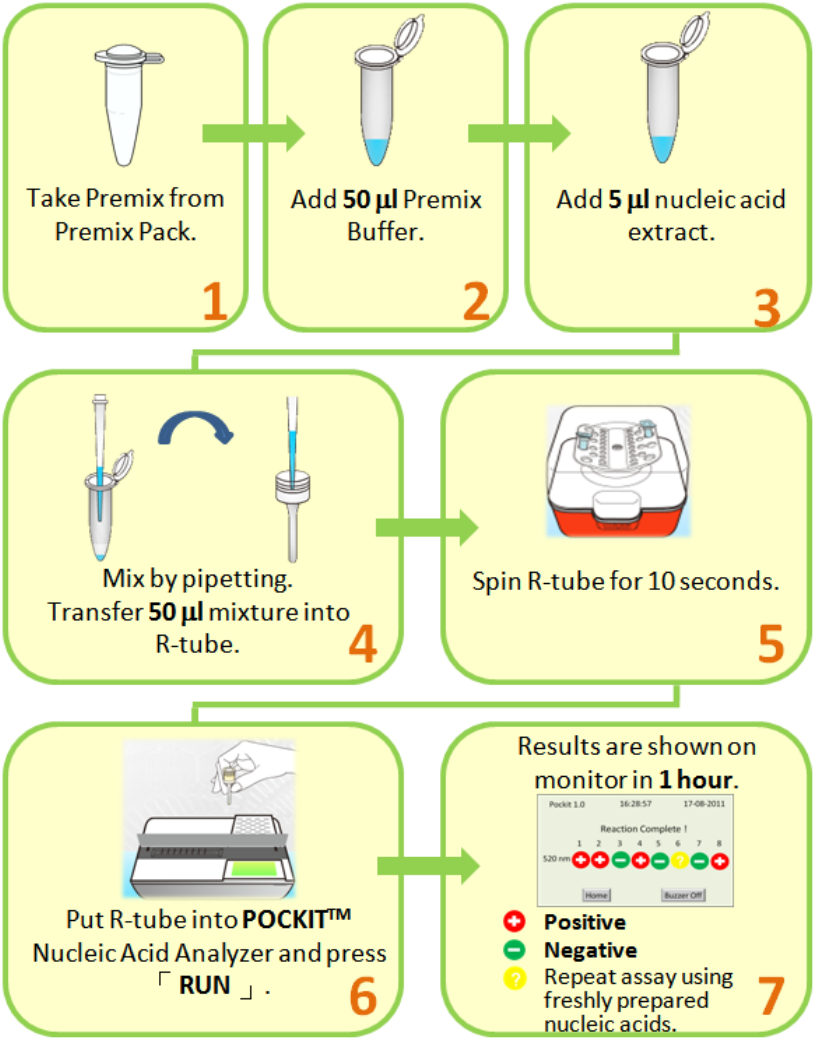
B. **PetNAD™** Nucleic Acid Co-prep Kit is recommended for nucleic acid extraction.

C. Any deviation from recommended procedure may not achieve the optimal results and should be validated by the users.

D. It is strongly recommended to use freshly prepared nucleic acid (within 1 hour after extraction) to achieve optimal results with **PetNAD™** FIV Detection Kit.

PROCEDURE

A. PetNAD™ FIV Detection Kit Quick Guide



B. Procedure

Note: Before using for the first time, add 100 µl Standard Buffer to P(+) Standard. Store reconstituted P(+) Standard at 4°C.

1) Label R-tube(s) in the label area.
2) Prepare one Premix for each sample. (Premix tube is in Premix Pack. Each Premix Pack contains one Premix.)

Note: If the pellet is not found at the bottom of the tube, spin tube briefly to bring it down.

3) Add 50 µl Premix Buffer A to each Premix tube.
4) Add 5 µl nucleic acid extract or P(+) Standard to each Premix tube. Mix by pipetting up and down.
5) Transfer 50 µl Premix/sample mixture into R-tube.
6) Seal top of each R-tube with a cap. Make sure R-tube is capped tightly.
7) Place R-tube into the holder of **POCKIT™.**
8) Spin tube briefly in **cubee™** to make sure all solution is collected at the bottom of R-tube.

Note: Start reaction within 1 hour to prevent nucleic acid degradation.

Note: Make sure there are no bubbles in the tube.

9) **POCKIT™** reaction:

Note: Please see the user manual of POCKIT™ for details.

a) Turn on **POCKIT™**, which should complete

self-testing within 5 minutes.

b) Select ″520 nm″.

c) When ″System READY″ is displayed, place the holder with R-tube(s) into the reaction chamber.

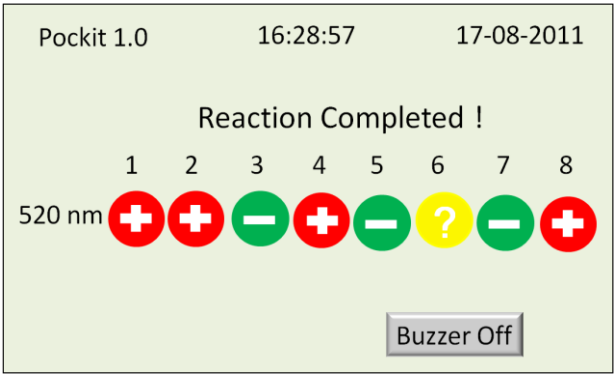
d) Tap cap of each R-tube to make sure the tube is positioned properly.

10) Close lid and press ″Run″ to start reaction program.

11) Test results are shown on the monitor after reaction is completed.

DATA INTERPRETATION

* One example of results shown on the monitor.



520nm	Interpretation
⊕	FIV Positive
⊖	FIV Negative
?	Repeat reaction with freshly prepared nucleic acid.

ANYLYTICAL SENSITIVITY

The detection limit of **PetNAD™** FIV Detection Kit is about 10 copies/ reaction.

TROUBLESHOOTING

Problems	Possible causes	Solutions
False Positive	1) Reuse of micro-centrifuge tubes, tips, R-tubes and Premix.	■ Micro-centrifuge tubes, tips, R-tubes and Premix are for single-use only. Reusing these accessories would cause cross-contamination. ■ Used micro-centrifuge tubes, tips, R-tubes and Premix should be collected and discarded according to local regulation. Do not place the waste close to the working area to prevent cross-contamination.
	2) Contaminated micropipette	■ Disassemble and clean up micropipette. ■ Use aerosol-free tips.
	3) Contaminated reagent	■ Consult with a GeneReach technical support representative or local distributor.
	4) Contaminated working area	■ Consult with a GeneReach technical support representative on how to clean up working.

Problems	**Possible causes**	**Solutions**
False Negative	1) Nucleic acid extraction failed.	■ Consult manual of nucleic acid extraction kit.
	2) Bad nucleic acid quality or nucleic acid concentration too high	■ Check sample storage condition. ■ Please refer to Troubleshooting section of PetNAD™ Nucleic Acid Co-prep Kit. ■ If a spectrophotometer is available, check OD 260/280 ratio. This ratio should be between 1.4 and 2.0.
	3) PCR inhibition	■ Do not overload nucleic acid. ■ Spike nucleic acid sample into P(+) Standard reaction for a parallel PCR reaction. Negative results indicate the presence of inhibitors in the nucleic acid. In that case, prepare another nucleic acid extract.
Heavy contamination of amplicons in reaction chamber of **POCKIT™**.	1) Leakage or spill of reaction from R-tube into reaction chamber of **POCKIT™**.	■ Consult with a GeneReach technical support representative or local distributor.

REFERENCE

1. American Association of Feline Practitioners. (2002). "Feline Immunodeficiency Virus". Cornell Feline Health Center. Cornell University, College of Veterinary Medicine. Retrieved 2008-11-12.
2. Chang, H.F.G., Tsai, Y.L., Tsai, C.F., Lin, C.K., Lee, P.Y., Teng, P.H., Su, C. and Jeng, C.C., (2012). A thermally baffled device for highly stabilized convective PCR. *Biotechnology Journal* 7(5): 662-666, doi: 10.1002/ biot.201100453
3. Janet, Y., Sanou, M., Abbott, J. and Coleman, J. (2010). Feline immunodeficiency virus model for designing HIV/AIDS vaccines. Current HIV Research 8: 14–25
4. Sodora, D.L., Shpaer, E.G., Kitchell, B.E., Dow, S.W., Hoover, E.A. and Mullins, J.I., (1994). Identification of three feline immunodeficiency virus (FIV) env gene subtypes and comparison of the FIV and human immunodeficiency virus type 1 evolutionary patterns. *J. Virol*. April 1994 vol. 68 no. 4 2230-2238.
5. Tsai Y.L., Wang H.T.T., Chang H.F. G., Tsai C.F., Lin C.K., Teng P.H., Su C. and Jeng C.C., (2012). Development of TaqMan probe-based insulated isothermal PCR (iiPCR) for sensitive and specific on-site pathogen detection. *PLoS ONE* 7(9): e45278. doi:10.1371/journal.pone.0045278.